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AUTHOR	Vanneman, Alan
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ABSTRACT

The National Assessment of Educational Progress (NAEP) continuously monitors the knowledge, skills, and performance of U.S. children and youth in a variety of academic subjects. The data collected are available in a series of major reports. The NAEP Facts series takes selected data from these reports and uses them to highlight specific issues of particular interest to teachers, researchers, policymakers, and other individuals with an interest in education. This concise report highlights long-term trends in student writing performance. The report's first section discusses results from the NAEP 1996 Long-Term Trend Writing Assessment. The results show a decline in scores for grade 11 students over the period 1984-1996, while scores for students in grades 4 and 8 remained unchanged. The second section discusses the analysis of long-term trend data. The third section deals with overall performance; while the fourth section addresses race/ethnicity and gender, showing that, as in the past, white students outperformed black and Hispanic students in writing in all three grades, and that, as in the past, female students outperformed male students for all three grades. The report points out that student writing performance remained largely unchanged from 1984 to 1996, except for the decline in scores noted for 11th grade students. It notes that recent research indicates that the use of computers in schools for instructional purposes may reduce student writing performance on paper-and-pencil writing assessments like this one. One figure and one table of data are included. (SR)

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NAEPFACTS

Vol. 3, No. 4 September 1998

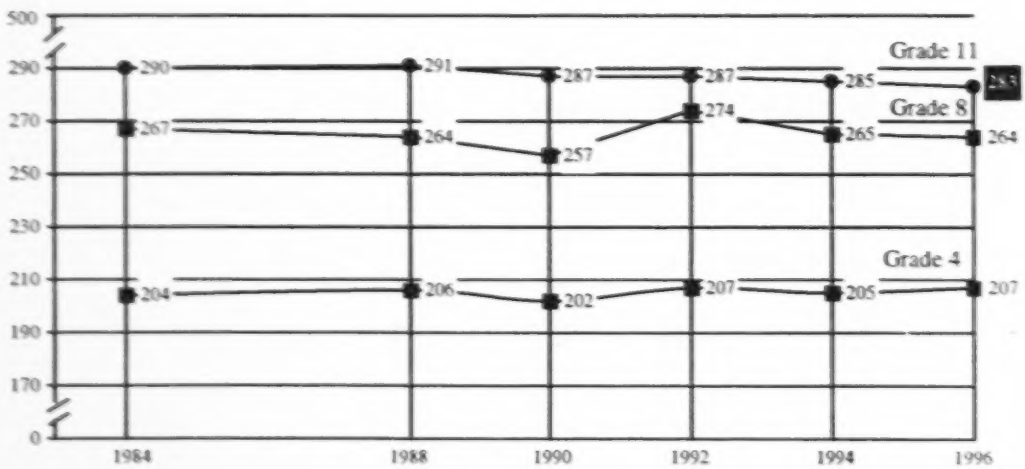
Long-Term Trends in Student Writing Performance

Summary: *Data from the NAEP 1996 Long-Term Trend Writing Assessment show a decline in scores for grade 11 students over the period 1984–1996. Scores for students in grades 4 and 8 remained unchanged. White students continued to have higher scores than both black and Hispanic students in all three grades. Female students continued to have higher scores than male students in all three grades. Scores for 8th-grade male students declined.*

The National Assessment of Educational Progress (NAEP) continuously monitors the knowledge, skills, and performance of the nation's children and youth in a variety of academic subjects. The data collected are available in a series of major reports. The *NAEPfacts* series takes selected data from these reports and uses them to highlight specific issues of particular interest to teachers, researchers, policymakers, and other individuals with an interest in education.

The assessments used by NAEP to evaluate long-term trends in student performance began in the early 1970s. Long-term trend assessments in science, mathematics, and reading go back to this period. Stu-

Figure 1.—NAEP Writing Average Scale Scores for the Nation



Round data markers indicate a negative linear trend (scores show an overall decrease).

Square data markers indicated no linear trend.

White numbers on a red background indicate 1996 scores were significantly lower than 1984 scores, at a 5 percent combined significance level per set of comparisons

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment.

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dents were assessed at ages 9, 13, and 17. In 1984 a long-term trend assessment in a fourth subject, writing, was added. NAEP's writing assessments assess students by grade, unlike the other three long-term assessments.

Over the past 14 years, NAEP has administered six long-term trend assessments to monitor progress in the writing performance of 4th-, 8th-, and 11th-grade students. NAEP has used the same administration procedures and the same 12 writing tasks in each of these assessments, in order to measure trends in writing achievement over time.

Table 1.—Average Scale Scores in Writing by Race/Ethnicity and Gender

	Grade 4			Grade 8			Grade 11		
	1984	1996	Trend	1984	1996	Trend	1984	1996	Trend
Nation	204	207		267	264		290*	283	l
White	211	216		272	271		297*	289	l
Black	182	182		247	242		270	267	
Hispanic	189	191		247	246		259	269	q
Male	201	200		258*	251		281*	275	l
Female	208	214		276	276		299	292	l

*Statistically significant difference from 1996, at a 5 percent combined significance level per set of comparisons.

L=Positive Linear Trend l=Negative Linear Trend

Q=Positive Quadratic Trend q=Negative Quadratic Trend

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Long-Term Trend Assessment. Consult this publication for graphs and complete scale score data for all subgroups on each assessment.

The assessments examine students' abilities in three types of writing: informative, persuasive, and narrative. Informative tasks asked students to write descriptions, reports, and analyses; persuasive tasks asked students to write convincing letters and arguments; and narrative tasks asked students to write fictional stories. Students' performance on these tasks were evaluated on the basis of their success in achieving the purpose of the task.

Analyzing Long-Term Trend Data

Changes in long-term trend data can be analyzed in a number of ways. Student scores for given years can be compared for statistically significant differences. In this report, scores for student groups or subgroups from the first assessment are compared with the results from the most recent assessment. Scores are described as "higher" or "lower" only if the difference is statistically significant—that is, unlikely to be the result of the chance factors associated with the sampling and measurement errors inherent in any large-scale sample survey effort like NAEP.

It is also possible to analyze a series of scores for overall trends, rather than year-to-year variations. Specifically, a series of scores can be analyzed for "linear" and "quadratic" trends. Linear trends can be represented as straight lines. A positive linear trend indicates that overall the average scores for a given student group form a rising line, while a negative linear trend indicates a declining one. A series of scores can show a linear trend despite wide variation among individual scores, as long as the overall pattern is either up or down.[1]

Quadratic trends can be represented as simple curves, and can be represented mathematically by quadratic equations.[2] A positive quadratic trend indicates that scores form a simple curve with one or both ends higher than its center—scores sagged, and then either leveled off or rose, or were flat and then rose. A negative quadratic trend indicates a simple curve whose center is higher than one or both ends—scores rose, and then either leveled off or declined, or were flat and then declined. It is possible for scores to display both a linear and a quadratic trend. For example, if scores rose sharply and then flattened out, this would constitute a negative quadratic trend. However, if the pattern of the scores still showed an increase for the entire

time period, the scores would also display a positive linear trend.

Overall Performance

Scores for 11th graders were lower in 1996 than in 1984, the first writing assessment (see figure 1). Eleventh graders' scores showed a negative linear trend over time. Scores for both 4th and 8th graders showed no trends of any kind, and comparisons of 1984 and 1996 scores show no change.[3]

Race/Ethnicity and Gender

In 1996, white students outperformed black and Hispanic students in writing, in all three grades, as they have done in the past (see table 1). Female students outperformed male students for all three grades, as they have done in the past.

Few subgroups recorded any changes in writing scores over the years 1984–1996. No changes at all were recorded for 4th graders. Among 8th graders, male students had a lower average score in 1996 than in 1984.

Among 11th graders, whites and males had lower scores in 1996 than in 1984, and had negative linear trends as well. Scores for female 11th graders also showed a negative linear trend. Scores for Hispanic 11th graders showed a negative quadratic trend: scores first rose and then fell.

Traditionally, NAEP long-term trend reports discuss changes in the differences in performance among subgroups as determined by race/ethnicity and gender. However, no changes of any kind have occurred in the differences in performance of these subgroups on the long-term trend writing assessments.

Conclusion

Student writing performance remained largely unchanged from 1984 to 1996, except for the decline in scores noted for 11th grade students. One issue to consider when looking at student writing performance is the use of computers in education. Recent research by Russell and Haney indicates that the use of computers in schools for instructional purposes may reduce student writing performance on paper-and-pencil writing assessments like the NAEP Long-Term Trend Writing Assessment.[4] Russell and Haney found that students tested using paper and pencil scored less well than those using computers, when given the same writing assignments.

Statistics assembled by the National Center for Education Statistics show a steady increase in computer use by students in grades one through eight: 31.5 percent in 1984, to 52.3 percent in 1989, and 68.9 percent in 1993.[5] Readers interested in the issues raised by the increase in computerized writing instruction should consult the paper by Russell and Haney cited in footnote 4 below.

Notes

[1] A series of scores may show a linear trend, either positive or negative, even though a comparison of the first and last scores does not show a statistically significant difference. The reverse is true as well.

[2] Quadratic equations, familiar from elementary algebra, involve variables with a power no greater than 2. For example, the equation $y^2=R^2-x^2$ (or $y = \sqrt{R^2 - x^2}$) is a quadratic equation, in particular, the equation used for graphing a circle. For purposes of trend analysis, this equation could be used to represent either a positive quadratic trend in which scores first fell and then rose to their original starting point, or a negative quadratic trend in which scores first rose and then fell to their original starting point.

[3] Eighth-grade scores dropped in 1990 and then rebounded sharply in 1992. The Educational Testing Service, which administers NAEP on behalf of NCES, reviewed and evaluated all of its administrative, scoring, and analysis procedures to ensure that the changes reflected actual student performance. The review and evaluation found no inconsistencies. For more detailed information see Carlson, J. & Johnson, E. (1994). Grade 8 writing trend: Investigation of the changes in mean proficiency between 1988 and 1990 and between 1990 and 1992. In E.G. Johnson, and J.E. Carlson, *The NAEP 1992 Technical Report*. National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

[4] Russell, M. & Haney, W. (1997) Testing Writing on Computers. *Education Policy Analysis Archives*. Tempe, AZ. **http://olam.ed.asu.edu/epaa/v5n3.html**.

[5] Snyder, T.D. & Hoffman, C.M. (1990) Digest of Education Statistics. Washington, DC: U.S. Department of Education. Snyder, T.D. & Hoffman, C.M. (1994) Digest of Education Statistics. Washington, DC: U.S. Department of Education. **http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=94115XXXXX**.

For Further Information

NAEP 1996 Trends in Academic Progress offers the complete report. Single copies are available free from the National Center for Education Statistics, U.S. Department of Education, Washington, DC 20208–5653. Copies may also be obtained over the World Wide Web at **http://nces.ed.gov/NAEP/96report/97986.shtml**.

NAEPfacts briefly summarize findings from the National Assessment of Educational Progress (NAEP). The series is a product of the National Center for Education Statistics, Pascal D. Forgione, Jr., Commissioner, and Gary W. Phillips, Associate Commissioner for Education Assessment. This issue of *NAEPfacts* was written by Alan Vanneman, of the Education Statistics Services Institute, in support of the National Center for Education Statistics. To order other NAEP publications, call Bob Clemons at 202–219–1690, or e-mail bob_clemons@ed.gov.

The NCES World Wide Web Home Page is **http://nces.ed.gov/**. The NAEP World Wide Web Home Page is **http://nces.ed.gov/naep/**

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